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THE CLIMATE OF JAPAN AND FORMOSA

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The climate of the festoon of islands which begins in the south with Formosa near latitude 21° N., and stretches northward to Yezo near latitude 46° N. is exceptionally interesting, not only as illustrating the change of climate which naturally comes about with such a change of latitude, but also because it presents so great a contrast to the other countries bordering the same ocean at the same latitude.

A large body of data is now available for describing the climate of Japan and Formosa since the Central Meteorological Observatory of Tokio has been at work for over thirty years observing and collecting the results of other observatories. Thus a more detailed description of the climate of Japan and Formosa is possible than has as yet been available, altho there will be modifications to make when further data are forthcoming.

The object of the present article is to give as full an account of the climate of Japan and Formosa as possible, indicating, where ever it seems possible, the response of the people to this part of their environment.

No description of the climate of Japan would be complete that did not emphasize the influence of the continent of Asia. Therefore at the risk of repeating what is already well-known, an introductory account of the general results of the position is included. This is followed by a consideration of the effects of the ocean currents, and an account of the storms to which the islands are subject. After these general considerations a detailed description of each of the climatic zones is given, together with some account of the effect of the climate upon the life of the people.

GENERAL RESULTS OF POSITION

Japan is situated off the east coast of Asia so that during the cold season it has an immense stretch of frozen land to windward, and as a result its temperature is far colder than is normal for its latitude. In addition to the modification in temperature the distribution of rainfall is also a result of the proximity of the great land mass.

In winter the central part of Asia becomes an area of high pressure since the lands cool more quickly and get much colder than the water, therefore the winds blow out from the centre. Fig. 1 shows the winter winds of Japan and Formosa. Japan comes into the track of the northwest winds which sweep across the frozen lands of Siberia. To these winds the bitterly cold winter, particularly marked in the island of Yezo, is due. Formosa, on the other hand, lies in the zone of the North East Trade Winds during the cool season, and thus its winter winds come from a north-easterly direction.

In summer the central part of Asia becomes an area of low pressure, due to the heating of the land mass, and consequently winds blow in towards the centre from all sides. Fig. 2 shows the direction of such of these winds as cross Japan. It will be noticed that they blow from the southeast and that they traverse the ocean before reaching Japan, thus they are warm moisture-laden winds. To these winds the southern coast of Japan owes the greater part of its rain, while Formosa which lies far enough to the south to get the full force of the Monsoon, shares with China one of the heaviest rainfalls of the entire globe.

OCEAN CURRENTS

It was formerly thought that the ocean currents which flow in the adjoining seas were one of the most important factors of the climate of Japan. Recent investigations have led to a modification of this view. Therefore it is necessary to examine the effects of the ocean currents on the climate.

There are two warm ocean currents, the Tsushima and the Kuroshio, and one cold current, the Oyashio. The warm Tsushima enters the sea of Japan thru the strait of Korea and touches the northwest coast of Nippon.[4] The curve of the isotherms on the west coast of Japan, which may be seen in Fig. 4, is perhaps due in part to this current, altho in the main, the relief is responsible for the course of the isotherms. A large amount of the fog and rain which comes to the west coast during the winter may also be due in part to this current since in winter the prevailing wind comes straight from that part of the ocean which is warmed by it.

The cold current called the Oyashio, flowing in a southwesterly direction, touches the eastern and southern coasts of Hakodate and also eastern Nippon, and may contribute towards lowering the temperature of these districts. The other warm current, the Kuroshio, which touches the southern coast of Nippon in its course towards the northeast, is far more powerful than either of the others, and higher

Fig. 1

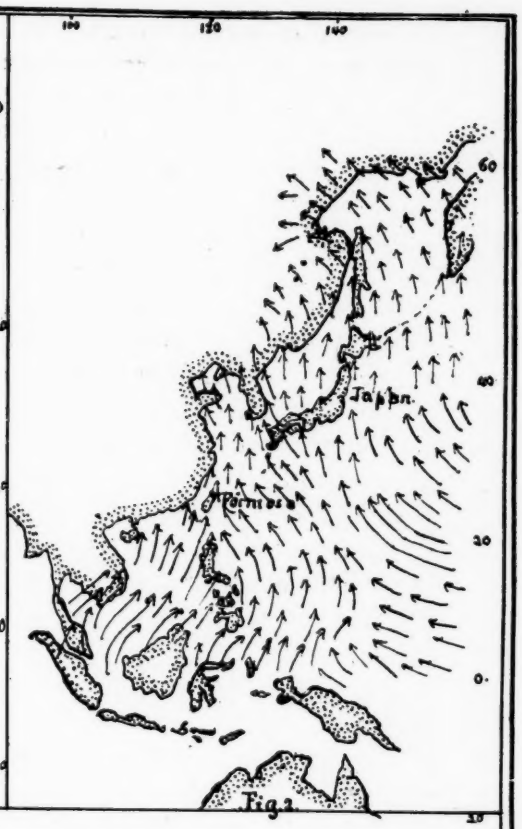

Fig. 2

Fig. 1 Ocean Winds during January and February.
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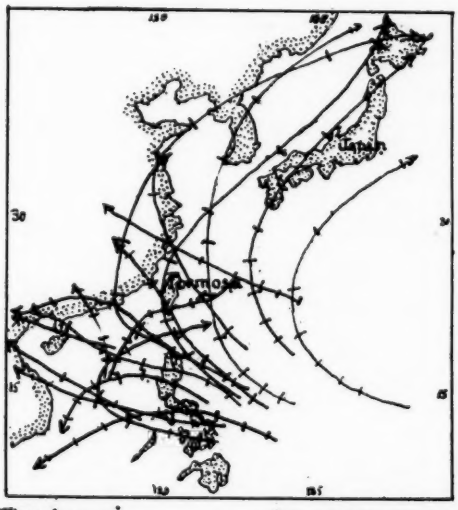

Fig. 3. Average Typhoon Tracks. By W. Doberck. Average rate of progress per 24 hours indicated by short cross lines.

Fig. 2. Ocean Winds during July and August.
Bartholomew Phys. Atlas. Pl. 14.

in temperature than the Tsushima. The great amount of rain on the southeastern coast of Japan during the summer may be partly due to this current.

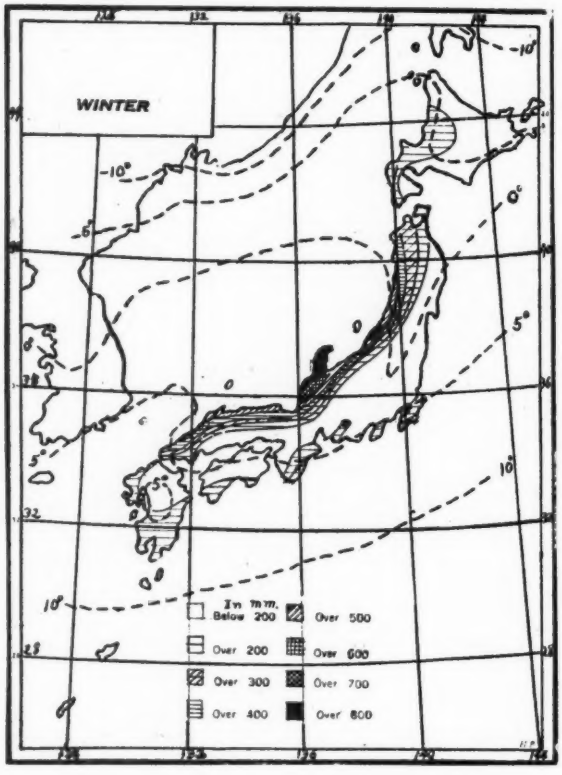

Fig. 4. Winter temperatures and rainfall

In the report of the Central Meteorological Observatory of Japan, issued in 1893, it is stated that the effect of the Kuroshio is far less than that of the other two currents, and that the current view as to the great effect it has upon the climate is incorrect. This conclusion is supported by the fact that in winter the average temperature of Japan is 10° F. colder than is normal for its latitude.[5] This is in striking contrast to the state of affairs in the British Isles, where the average winter temperature is 30° F. warmer than is normal for its latitude and shows that the influence of the warm currents on the climate of Japan is not comparable to that of the Gulf Stream Drift upon climate of the British Isles. The same report as is quoted above also emphasizes the effect of the two smaller currents, but the isoanomalous lines, as given in the Meteorological Atlas, hardly support this view.[5] It seems as if more detailed research work on the subject is necessary before any satisfactory conclusion can be drawn.

Storms

Not only is the climate of Japan profoundly modified by the influence of the continent on the west and the ocean on the east, but the storms which sweep across it play their part. Fig. 6 shows that Japan

receives a large number of cyclonic storms every year. The shading on the map shows the frequency of these storms during the years 1905–1915. The map is based on the daily weather maps issued by the Central Observatory of Tokio, which is by far the most detailed and accurate body of data yet available. When comparing it with maps which show the frequency of cyclonic storms in Europe it must be borne in mind that the areas into which the Japanese map is divided are $2\frac{1}{2}°$ of latitude by $2\frac{1}{2}°$ of longitude, while the more usual system is to divide the map into areas of $2\frac{1}{2}°$ of latitude by 5° of longitude. Allowing for this fact it is apparent that Japan has not as many storms as western Europe or as the eastern part of the United States,[6] but that enough storms strike Japan to relieve the climate from the monotony which prevails in Formosa and in the countries which face Japan on the mainland of Asia.

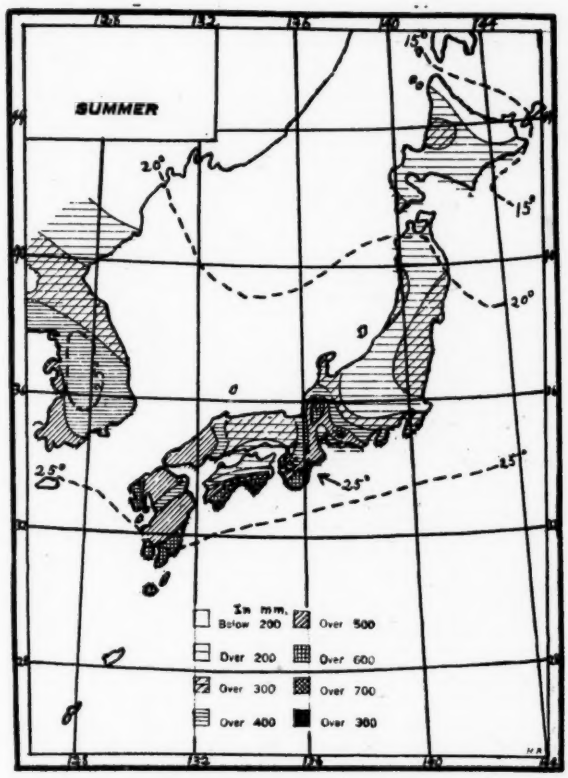

FIG. 5. Summer temperatures and rainfall

In addition to the cyclones this festoon of islands is visited by typhoons. Formosa lies right in their track and the storms generally move towards the northwest or the west-northwest and sometimes curve around to the northeast, in which case they strike the southern part of Japan; Fig. 3 shows the course and frequency of these storms.[3]

CLIMATIC ZONES

Such are the general conditions which determine the character of the climate of Japan, it now remains to consider the different climatic zones separately.

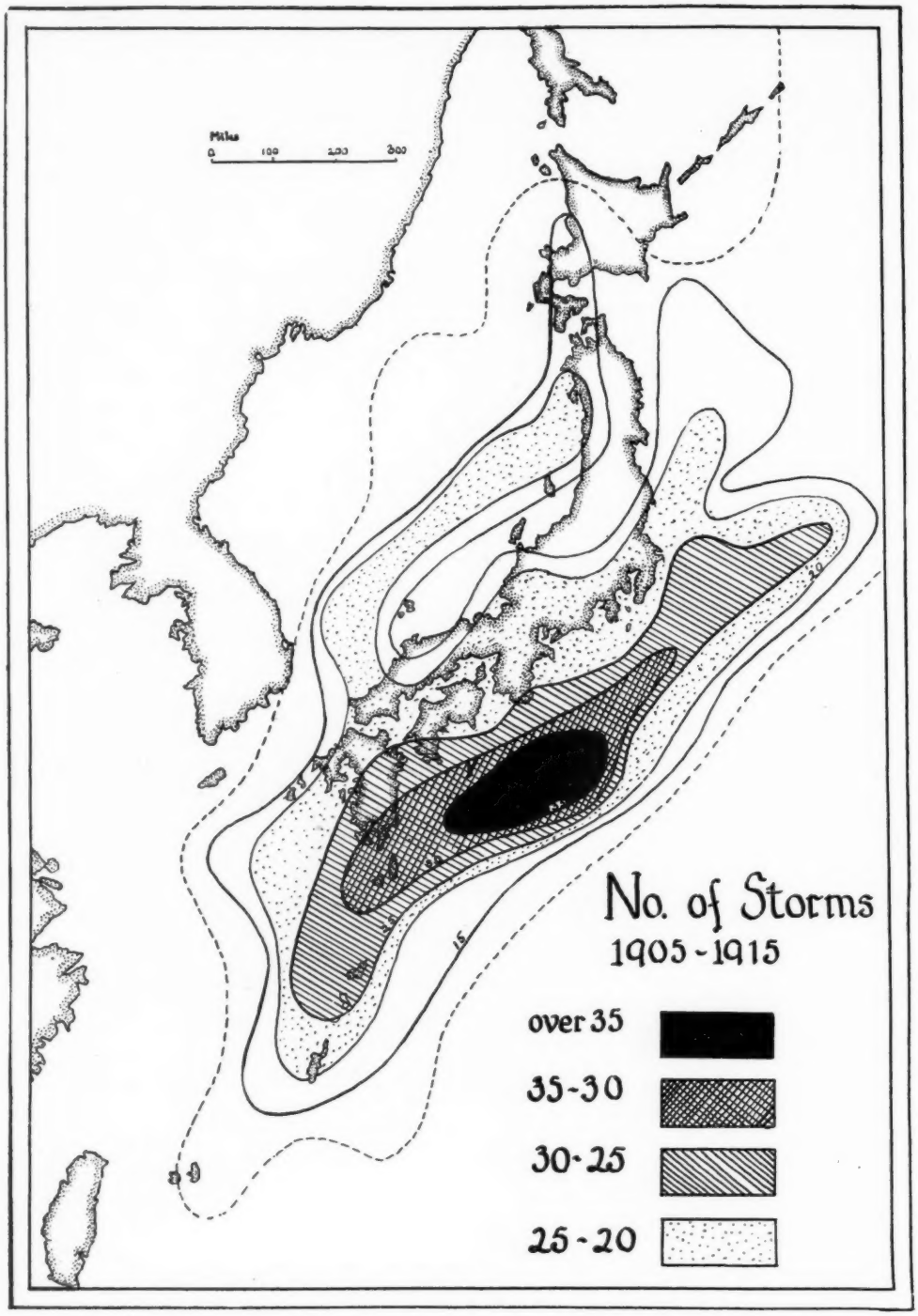

FIG. 6. Frequency of cyclonic storms in Japan and Formosa. Number of storms occurring in areas 2½° in latitude and 2½° in longitude during 10 years, 1905–1915. (Compiled from data given in Art. 4, Vol. XXXVII, of *Journal of Coll. of Sc.* Imp. Univ. of Tokio, 1916, pp. 6–8. These data prepared by Terada, Tokata, and Otuki from daily weather maps and monthly weather review of the Central Meteorological Observatory, Tokio.) From Monthly Weather Review.

From the point of view of the agriculturalist the festoon of islands comprising Japan and Formosa is divided into four zones by the isotherms of winter, which are shown in Fig. 4. In the northern part the ground is frozen during the winter and only in summer time is agriculture possible. Therefore a *Northern Zone* may be marked off comprising all the land north of this isotherm.

As one goes southward winter crops become practicable and in the southern part of the main island two crops a year are the regular order of things. Thus a *Central Zone* between the isotherms 32° F. and 40° F. may be marked off. The south of Japan is semi-tropical, as many as three crops a year being raised: this may be termed the *Southern Zone*. Formosa, where conditions are tropical, stands by itself as the fourth climatic zone.

Variations in the rainfall due to the varying direction of the prevailing winds and difference in the frequency of the cyclonic storms make necessary certain sub-divisions of the two northern of the zones of the agriculturalist. The Northern Zone may be divided into an extreme northern division, with Nemuro as its type, and a southerly division with Hakodate as its type. In the Hakodate region the rainfall and storminess are far greater than in the extreme north. On the other hand the Central Zone is divided by a north-south line into an eastern region, which gets summer rain, and a western region that gets winter rain. The other two zones of the agriculturalist remain unchanged.

Fig. 7 shows the extent of these zones, and Fig. 8 shows the temperature and rainfall grafs of typical places in each.

THE NORTHERN ZONE

The Nemuro Type. In the extreme northern part, comprising the greater part of the Island of Yezo, the climate is unusually severe for the latitude and unusually extreme for an island. The average winter temperature is everywhere below 20° F. and winter continues for more than three months, while in the center the average temperature is as low as 12° F. The severe winter is followed by a summer during which the average temperature is as high as 70° F. in the center and nowhere less than 60° F. Thus northern Yezo may be said to have a continental climate altho it is a small piece of land entirely surrounded by water.

The extreme north differs from the rest of the Northern Zone in having a scanty rainfall; less than 20 inches annually fall thruout the greater part of this region. The map which shows the course of

the cyclonic storms gives a clue to the reason for this scarcity of rain; since the storms sweep northward along two tracks, the larger branch passing over Tokio and so eastward to the ocean, and the smaller branch passing over Niigata and northward to the Japanese Sea, neither branch sweeps over northern Yezo. As a result the rain is scarce and the variability of the climate of the extreme north is far less than in the center.

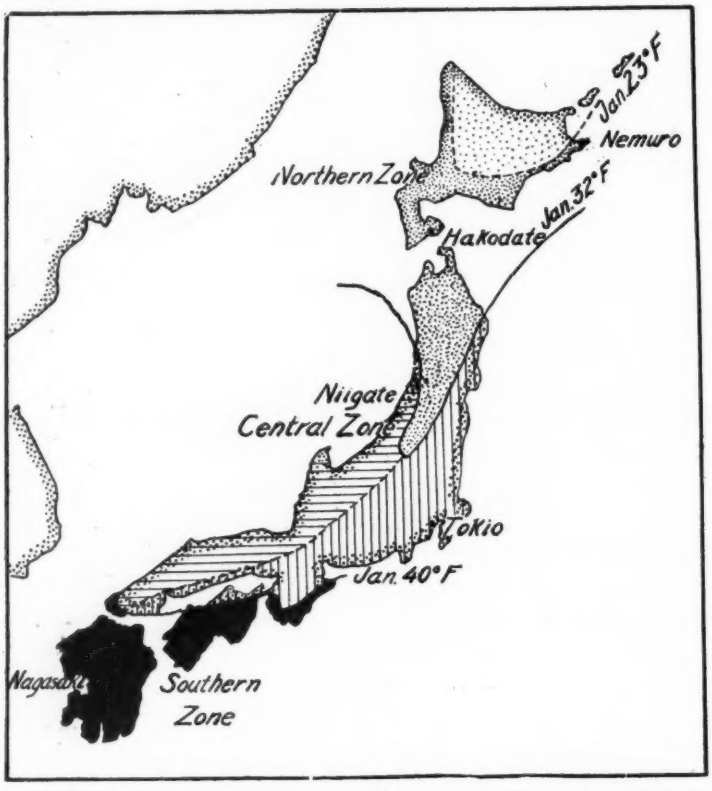

FIG. 7. Map showing climatic zones. (Isotherms after Tokio Central Meteorological Observatory, Tokio.) From Monthly Weather Review.

Fig. 9 gives the distribution of population in Japan. It shows that the northern part is extremely sparsely populated. Fig. 10 shows that the forests which constitute the primitive vegetation have as yet not been cleared, and all reports emphasize the backwardness of agricultural development.[13] The census returns show that the proportion of men to women is greater here than in any other part of Japan. These conditions may without doubt be attributed to the severity of the climate, while the slighter rainfall and lesser variability play their part in rendering conditions less favorable for development.

Thus a very interesting state of affairs exists, frontier conditions with all their stimulating influence still prevailing in Yezo, which is only a short distance from the capital and from the most progressive parts of the country.

The Hakodate Type. As one travels toward the south both winter and summer temperatures become less extreme, as is shown in Figs. 4 and 5, and the rainfall increases. More storms are received, as is shown in Fig. 6, and this accounts both for the increase in the rainfall and for the greater variability of the climate. The population in this part is sparse, altho greater than further north. The forests are cleared on the lowlands, altho on the higher ground they still remain untouched. Agriculture is practised in the intensive form common to Japan and China, but there is no growing of crops for export. The introduction of the sugar-beet in this region as a crop is an interesting example of the way in which Japan is ready to take up foreign ideas. Industrial development is already beginning and under American guidance the Japanese are learning how to fight the winter cold by means of solidly-built houses supplied with heating apparatus. The development of Yezo will be interesting in the light of the newer theories as to the effect of climate on human energy.

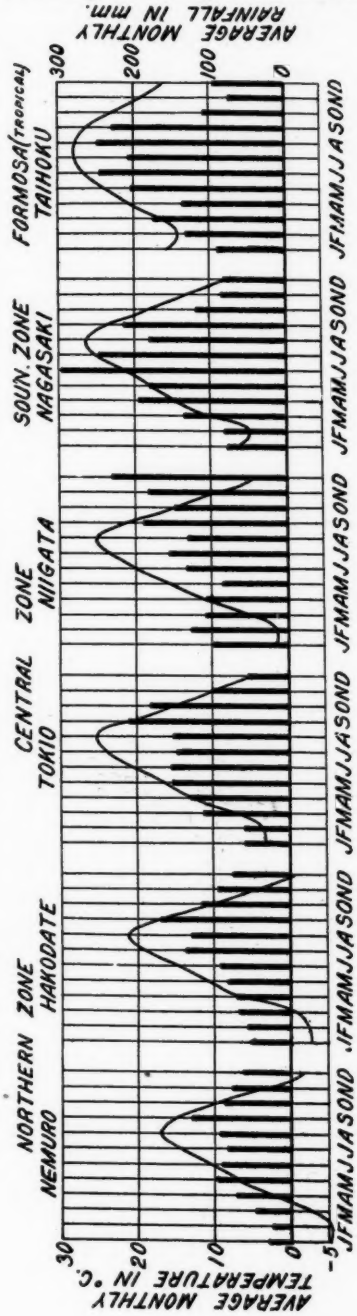

FIG. 8. Average monthly temperature (solid lines) and rainfall curves (vertical bars) of typical places in each zone. From Monthly Weather Review.

THE CENTRAL ZONE

The Tokio Type. This type comes nearest to the optimum both in temperature and humidity (as defined by Professor Huntington[8]) as well as being the most variable on account of the storms. The central

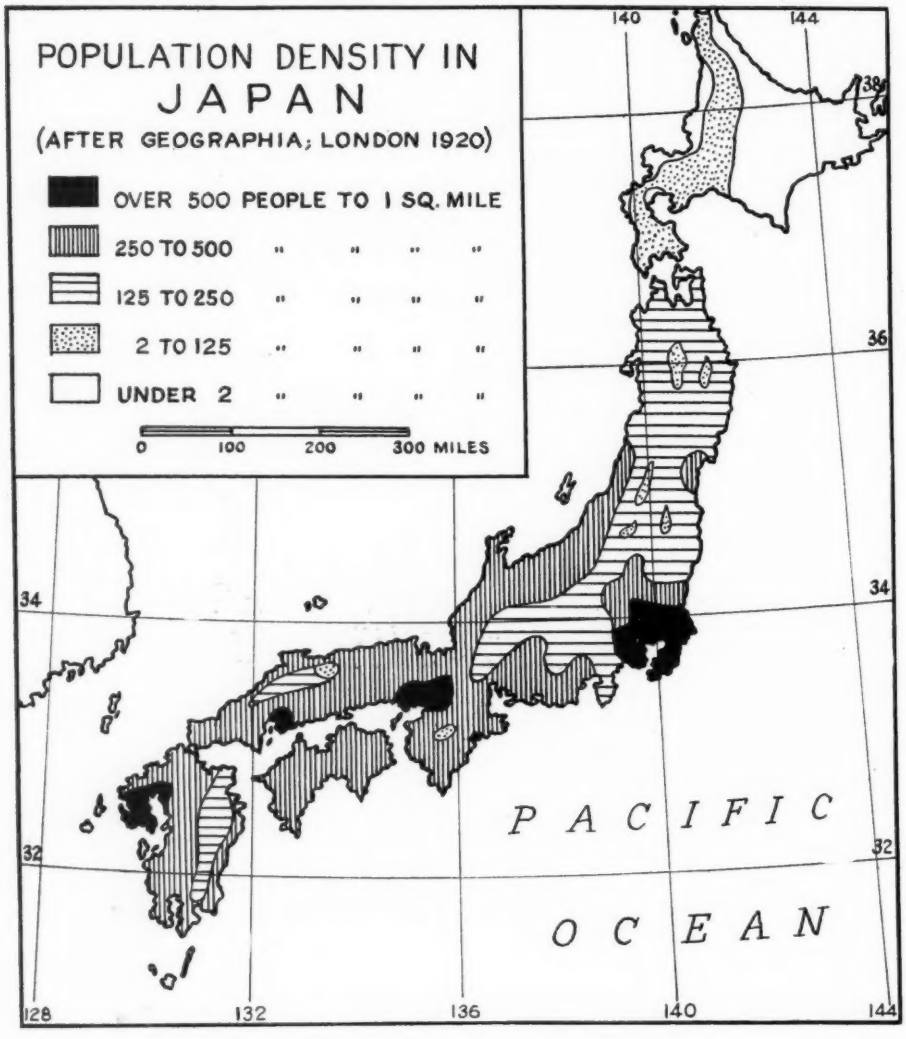

FIG. 9. The distribution of population in Japan

part of the eastern coastal strip of Japan is a good deal warmer in winter than corresponding regions on the opposite coast (Fig. 4). This can perhaps be explained as the influence of the Kuroshio and the protecting backbone of mountains which shelter the coastal strip from the bitter winds of Siberia and cause it to have fine clear weather during

the greater part of the winter. It is, however, cold enough for snow to fall in all parts and to lie upon the ground even in the south. The way in which the mountains run is of the greatest assistance to the farmers since the sheltered slopes face southward and thus greater

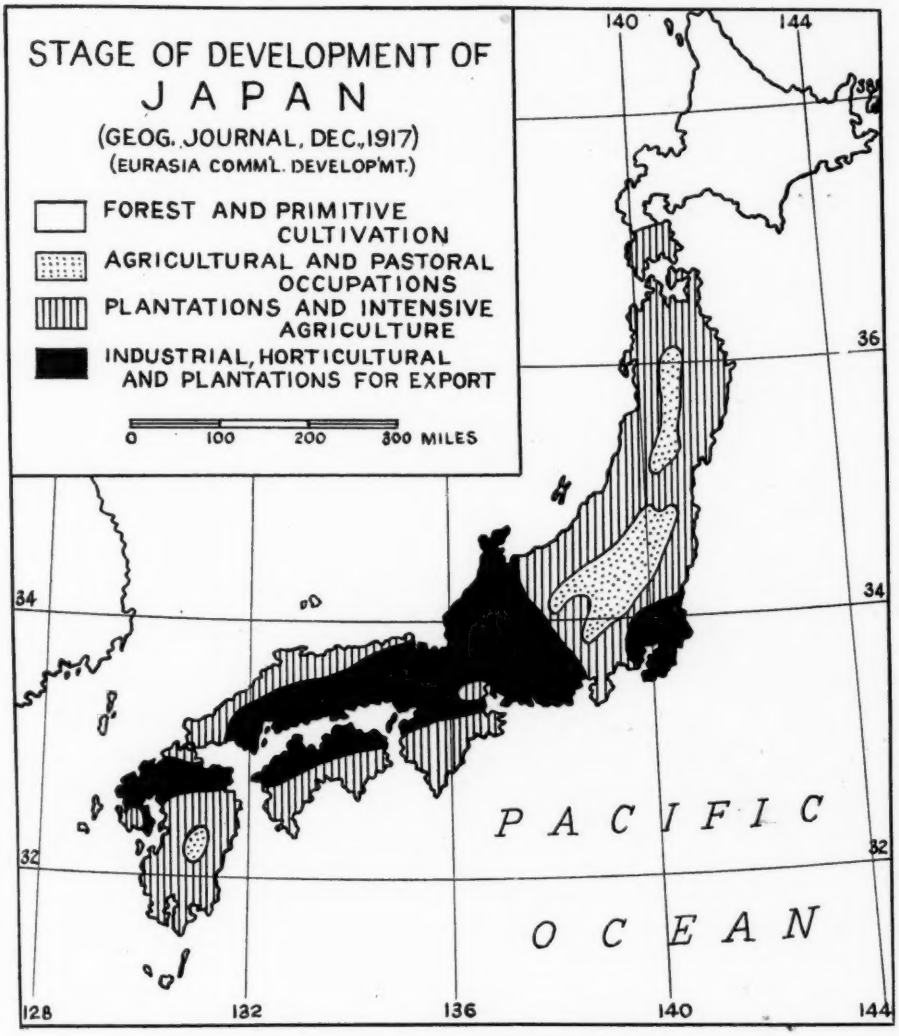

FIG. 10. The stage of development in Japan

insolation, and the central ridge is a protection from the winter monsoon. The cyclonic storms are most frequent in this part (Fig. 6) and account in part for the heavy summer rainfall. The noticeable dip in the rainfall graf during the summer months being due to the fact that the cyclonic storms are less frequent in July than in June or

August. Ranges of high mountains running parallel to the coast receive the full force of the prevailing winds from the ocean and cause this coastal strip to be one of the rainiest parts of Japan.

The Niigata Type. The western coastal region does not differ greatly in temperature from that of the eastern coast, but most people would find it a much less agreeable climate since it gets far more rain and fog and less bright sunshine. In winter, during the regular rainy season, not a day passes without some rain or snow brought by the bitter northwest winds, and in summer the cyclonic storms bring a good deal of rain, the same double maximum being noted as in the Tokio graf.

This zone includes the most progressive part of Japan where manufactures are springing up, where trade is most vigorous where the University is the oldest and most energetic, and where the seat of government is situated, the Tokio region being distinctly ahead of the opposite coast.

In this zone agricultural development is at its maximum. The forests have been long since cleared except on the mountain heights and everywhere systematic and intensive agriculture of long duration takes their place. Tea plantations occupy the higher slopes, and rice in plains where flooding is possible. This is the main scheme of crops until the centre of the main island is reached when a change begins to appear owing to the greater warmth of the winters. Two crops a year are now available where the flooded rice fields can be drained at the end of the summer. The farmers work is very heavy for wheat, barley, and bean crops are raised during the winter while rice is still the staple crop of the summer season. This rice is far too good for home consumption. It is exported and inferior rice is imported from China to feed the workers. The winter crops are grown in rotation, wheat, rape and barley being grown in turn. In addition to these crops on the lowland, the upland fields produce summer crops of barley and wheat, as well as soja beans, sweet potatoes and millet. Where land is given up to market gardens, as in the neighborhood of the larger cities at least three crops a year are the ordinary course of events. Nor does the productivity of the land cease when the lowlands and upland slopes are accounted for, the plateaus and steep mountain slopes are also utilized, being laid out with mulberry trees for the silk-worms, and with fruit trees or planted with fodder crops. Land too poor for such trees and crops is either planted with a weed which can be used for manure, or is used for grazing. This state of things does not exist only in specialized districts but is as extensive as the islands will allow.

The whole land is one big farm and every square foot is eagerly exploited. The population map shows that this zone is the most densely populated of all Japan. This is in part due to the fact that industrial development is greatest here, altho so small a proportion of the people are engaged in manufacturing that the conditions for agriculture must still be considered the chief cause of the distribution of the population which is more owing to climate than to other conditions.

Tokio and the Pacific coastal strip in general have greater advantages for commerce than the opposite coast, since the winter monsoon makes Niigata and the ports on the Japan Sea of little use in winter. The most important ports of Japan are situated on the Pacific coast of the main island.

THE SOUTHERN ZONE

This zone is semi-tropical, its climate is warmer than that of the Central Zone, altho in winter some snow falls and sometimes lies on the ground. The average winter temperature is over 40° F. and the average summer temperature is between 75° and 80° F. the heat being rendered more enervating by the great humidity. The rainfall is very heavy, over 80 inches a year near the coast, the greater part of the rain coming in summer. Cyclonic storms are numerous and the variability, tho less than in the Tokio region, is still considerable, so that the climate is far more stimulating than that of Formosa.

In this zone the population is almost as dense and the agriculture is as highly developed as in the Central Zone. In addition to the crops raised in the Central Zone, sugar and camphor are exported.[9] Both in manufactures and in commerce however the Southern Zone is far behind the Central Zone, a fact which may be partly accounted for by the difference in climate.

Formosa

Formosa is situated on the Tropic of Cancer and has a tropical climate. The year is divided into two seasons; summer from April to October and winter from November to March. The summers are long and are accompanied by intense heat. The transition from winter to summer is very rapid, the warm season coming quickly after the cold months. The winters are short no severe cold being known, and altho high mountain peaks are snow capped, frost as a rule, is unknown on the lower levels.

The mean monthly temperature of January is, in the coolest parts, over 60° F. June to September is the hottest part of the year, the mean monthly temperature ranging between 79° and 82° F. No marked

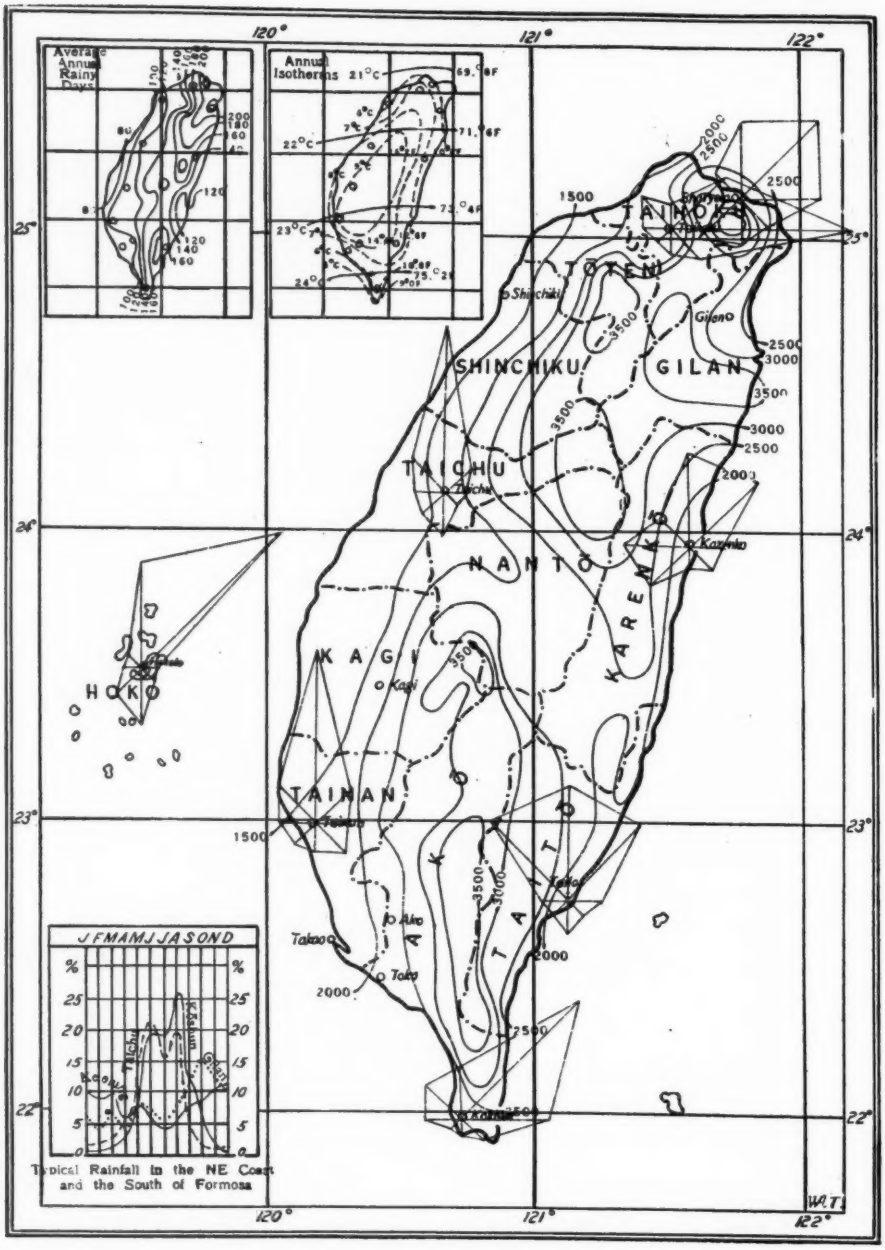

FIG. 11. Temperature and rainfall of Formosa

variation between north and south is seen during these months. The daily maximum will often rise above 86° F. and continue so for a whole month. Sometimes the east coast near the border experiences a hot dry wind similar to the "Föhn" which raises the temperature considerably. In winter the north differs somewhat from the south. February is the coldest month with 68° F. average monthly temperature in the south, and 57° F. in the north.

During the winter a strong northeast monsoon blows steadily and this combined with the mountains causes heavy rainfall in the north which lasts for several months. Kashoryo on the hillside near the eastern coast is probably the wettest place in the far east, having an average rainfall of 7338 mm. (289 in.). The west coast gets less rain because it is protected by the mountains.

During the summer the southwestern monsoon prevails and except during the occurrence of a typhoon the winds are light. Frequent thunder storms give abundant rainfall, and a typhoon will bring several hundred millimeters of rain on a single day.

Formosa lies in the highway of the great storms known as typhoons. These storms originate in the sea surrounding the Philippines, the west Carolines and the Mariana Islands or else in the China Sea itself. The earliest typhoons that visit Formosa occur in May and the latest in November, and sometimes from December to April there are none. August is the month when they generally occur and their frequency may be judged from the fact that in the seventeen years from 1897 to 1913 there were thirty remarkably severe typhoons. Fifteen of these occurred in August. The storms move generally towards the northwest or west-northwest and the northern half of the island of Formosa is directly in that district. The force of the wind is terrific and there is generally a corresponding ocean swell which is felt on the southwest coast. Fig. 11 epitomises the characteristics of the climate of Formosa.

There is far less data available on the development of Formosa than on Japan, however there is no doubt that it is far less progressive in spirit and far behind Japan in attainment.[10]

SUMMARY

Such are the general characteristics of the climatic zones. To resume the relative stage of development of each, one may say that the Tokio coastal strip leads in the race; that the Niigata strip and the Southern Zone follow closely; that the Hakodate region is pushing ahead and threatens to come next to the Tokio strip in the near future, while Formosa lags hopelessly behind. If the theme had been worked

out as a bit of special pleading on behalf of the theories of Dr. Ellsworth Huntington it could hardly have supported his position more satisfactorily.[11] It must be borne in mind, however, that climate is but one of the many conditions that make up geographic environment, and that geographic environment itself is but one of the many factors which make for civilization. Nor can it be too strongly urged that civilization consists of far more than commercial and industrial development.

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STATUS OF GEOGRAPHY IN THE NORMAL SCHOOLS OF THE EASTERN STATES

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This paper marks the completion of a survey of the status of geography in the normal schools of the United States. For survey purposes, the states were divided into three groups—the Far West, the Middle States, and the Eastern States. The survey of the normals of the Far West, and of the Middle States, appeared in the *Journal of Geography* of November, 1919, and September, 1920, respectively. To get the best results from a study of these articles, one should have all three parts, since the most valuable helps will come from comparisons based on the facts presented in them.

METHOD OF THE SURVEY

To secure data for this section of the survey, sixty letters and questionnaires were sent to representative normal schools in each eastern state. It will be noted that the accompanying chart lists only twenty-two schools. The reason for this is partly the cost of printing a longer chart and partly the seeming lack of interest in geography thruout the East, especially the southern East. This lack of interest was made manifest by the large number of failures to fill out and return the questionnaires. However, it is apparent that the schools listed will give an adequate idea of what the East is doing in geography. In every case the work which appears upon the chart is above high school grade.

EXPLANATION OF THE CHART

Column 1 lists the normal schools of the East which returned questionnaires. Several replied that they were giving no geography at all. Only one such school has been listed because those so replying were located in the South. When a letter accompanied the returned questionnaire it made plain, in most cases, that geography was not given because of lack of funds. It is fair to state that the South is weakest in geography work.

Column 2 states the total number of courses offered in each institution. About four schools stand out as leaders of geography in the East. It should also be stated that the normals of New York will enter upon a new course of study in the Fall of 1921 which will require

Name of School	Total Number of Courses	Required Courses					Elective Courses					All Courses	Head Teacher	Number of Teachers
		Number of Courses	Hours per Week	Weeks in Year	Total Hours per Year	Content or Method	Number of Courses	Hours per Week	Weeks in Year	Total Hours per Year	Content or Method	Total Possible Hours		
Aroostook, Me.	2	2	1.3 2.3	13 14	39 42 81	Method Content						81	Ida M. Folsom	1
Athens, Ga.		No	Geograp	hy	Offered									
Boston, Mass.	2	2	1.6 2.4	40 10	240 40 280	Content Method						280	L. O. Packard	1
Brockport, N. Y.	1	1	5	20	100	Both						100	Charles D. Cooper	1
Cortland, N. Y.	1	1	5	20	100	Both						100	Edith R. Tollerton	1
East Stroudsburg, Penn.	3	1	3	20	60	Methods	2	1.3 2.3	20 20	60 60 120	Both Both	180	Elizabeth Kurtz	1
Edinboro, Penn.	3	2	1.1 2.3	20 20	20 60 80	Both Both	1	3	20	60	Content	140	Miss R. K. Wells	1
Farmington, Me.	2	1 1(P)	5 5	24 24	120 120 240	Both Content						240	Virginia A. Porter	2
Farmville, Va.	6	2	1.3 2.3	18 18	54 54 108	Both Content	4	1.4 2.4 3.4 4.4	18 18 18 18	72 72 72 72 288	Content Content Content Content	396	Emma Dietrich	2
Frostburg, Md.	1	1	4	18	72	Method						72	Esther R. Buckley	1
Indiana, Penn.	4	3(P) 1	1.3 2.3 3.3 4.1	20 20 40 20	60 60 120 20 260	Content Both Both Both						260	Zoe A. Thralls	1

Keene, N. H.	2	2	1.3 2.2	18 18	54 36 90	Method Method						90	Julia M. Shipman	2
Mansfield, Pa.	1	1	3	20	60	Both						60	Marion Vail	1
Oneonta, N. Y.	1	1	5	20	100	Both						100	Anne E. Scott	1
Oswego, N. Y.	1	1	5	40	200	Methods						200	A. B. Myers	1
Plattsburg, N. Y.	1	1	5	20	100	Both						100	Anne C. Carroll	1
Plymouth, N. H.	2	2	1.3 2.3	36 18	108 54 162	Both Both						162	H. H. Lamson	2
Potsdam, N. Y.	1	1	4	20	80	Method						80	Marion B. Forsythe	1
Providence, R. I.	3	2	1.3 2.3	19 19	57 57 114	Content Method		4	19	76	Content	190	Robert M. Brown	1
Rock Hill, S. C.	4	1	5	36	180	Method	3	1.5 2.5 3.5	24 12 12	120 60 60 240	Content Content Content	420	Otto Harris	1
Salem, Mass.	7	7(P)	1.4 2.2 3.3 4.2 5.2 6.2 7.2	36 26 26 36 36 36 36	144 52 78 72 72 72 72 562	Both Both Both Content Both Both Both						562	Mabel C. Stark	2
Trenton, N. J.	2	2	1.3 2.3	20 20	60 60 120	Content Content						120	Cleo R. Chappell	1

two courses of three hours each in geography, to be taken by every student.

Column 3 gives the number of required courses in the different institutions. The letter "P" in parentheses indicates that these courses are required of some students only, being included in one course, such as the primary course, but not in others. It is encouraging to note that most of the work in geography in these eastern schools is required. This and the fact that few electives are given may lead to the conclusion that it is not a lack of interest but a lack of funds which keeps geography down in their schools. Probably the instructors are so busy with required work that little time is left for electives. Salem, Massachusetts, stands out from other schools by offering seven different courses designed to fit the needs of students preparing for different lines of teaching. They have, however, two teachers to do the work.

Column 4 shows the number of hours per week devoted to each required course. The first figures in the column, when followed by a period and another figure, indicate the course number. The majority of the work seems to be done in three period classes.

Column 5 states the number of weeks the course runs. This column will show the size of the enrollment because if it is necessary to offer the course only for one semester or quarter and it is a required course, the attendance must be low. In general the eastern schools seem to be on the semester basis which would permit of shorter courses than if they were on the four quarter plan.

Column 6 gives the total hours per year devoted to required courses. These totals are in most cases small because courses are not repeated each semester.

Column 7 indicates where the emphasis is placed. In the majority of cases the stress is divided between method and content. This cannot leave much time for content and it must be, therefore, that eastern grade teachers have little geographic knowledge to start their work with. Inasmuch as the number of electives is few, this conclusion must be right.

Columns 8, 9, 10, 11, and 12 offer the same information concerning electives as the previous columns give concerning required subjects. The electives are few in number, are offered only once a year, and have their emphasis upon content. Their scarcity indicates that eastern normals are not trying to produce specially trained teachers of geography.

Column 13 shows the total number of hours of the teacher's time devoted to geography thruout the year. It may indicate the amount of importance an institution places upon geography as it represents the salary—hours devoted to the subject. The results of this column do not show a comparison of the amount and variety of geography offered.

Columns 14 and 15 give the names of the instructors. In almost every case one teacher must do all the work. It is evident that they are overworked and have little time for electives or research. In two cases it was found that the geography was being taught by two different teachers who were at the same time carrying work in other subjects.

NAMES OF COURSES OFFERED

Methods in Geography
Physiography
Economic Geography
Principles of Geography
Political Geography
Junior High School Geography
Geography and Pedagogy
Commercial Literature
Teaching of Geography
General Geography
Commercial Geography
Relations of Geography to American History
Intermediate Geography
Primary Geography
Geography of South Carolina and Neighboring States
Continental Geography

GENERAL COMPARISONS AND CONCLUSIONS

At the risk of some repetition I wish to suggest some comparisons and conclusions that may be made and drawn by studying the charts. The comparisons will be made column for column and judgments will be based upon the figures shown and the personal letters received. It is understood that there may be certain influences working for or against a school impossible to show in a survey. This may cause the case of such a school to be stated unfairly, and if this be true a letter explaining such conditions will be appreciated.

The number of normal schools is least in the West and greatest in the East. Western normals are better supported and eastern ones the worst. Salaries are best, therefore, in the West. During the war, middle, western, and eastern normals raised their salaries, but since then western raises have been larger. Living costs are probably lower in the East when all conditions are equal. However, most of the western schools are in small cities or towns and hence living expenses are lower than in the East. In general it may be concluded that the West offers the best opportunities for a teacher of geography who is just entering the field. A teacher entering the western field will need

a better foundation in geology than a teacher of the other states. It should also be pointed out that a teacher in the West is handicapped by being so far distant from the Middle States and East that it is practically impossible to attend the important geographic meetings of the year. This should be remedied by bringing occasional meetings at least as far west as Denver or Salt Lake City.

The differences in the total number of courses offered in the three sections is striking. The West averages 3.5 courses to a school, the East 2.5, and the Middle States 5.5. Thus the Middle States are without a doubt doing the most varied work in geography; the West is a good second when one considers the small enrollment of western normals, and the East is far behind.

There is very little variation in the number of courses or amount of work which is required in each section with the possible exception of the South. In most cases one course is called for. More must be required and normal school teachers must work to that end. A year of required geography in the four year college course is not too much to ask for. In the two year course there should be at least a half year of required work. An understanding of geographic principles calls for more mature thought than can be expected of children in the third, fourth, fifth, and possibly sixth grades. The author believes that geography, in a formal form, should be taken out of those grades and placed in the eighth grade and the high school.

The most popular course is the five hour course, especially in those schools which are on the four quarter basis. Three hour courses in such schools would be entirely inadequate. In schools which are upon the semester basis a three hour course is about equal to a five hour course in the four quarter plan.

From a study of the number of weeks in the year it is apparent that many of the Middle States schools are following the four quarter plan; the West is rapidly changing to it, and the East in general still retains the semester plan. It is probably true that the time is close at hand when most of our schools of higher education will be on the four quarter basis. Teachers of geography must plan their future work with this in view or the tendency will be to make less geography instead of more required.

The emphasis seems to be inclining toward content. Methods can be suggested along with content but a course devoted only to methods is a waste of time for students who have only a smattering of geographic knowledge. The student needs content and we cannot afford to spend more time with methods until more geography is given in the high school.

The number of elective courses is greatest in the Middle States because of more help and larger enrollments, but the West is again a good second. The East is doing very little along this line. It seems to the writer, that unless normal schools interest students in geography work and the possibilities of geography teaching our schools will run short of trained geography teachers. The head of the geography department in one of our foremost universities says that they cannot begin to fill the demand for trained geography teachers. The reason for this is that few students who take their entire four years of work in the university become interested in geography. The normal school is the logical place to start the training of the geography teacher. Hence our normals—those which are four year schools—should offer a variety of electives. One year of required work and enough electives so that a different one can be taken each semester would be the ideal arrangement. The junior high school is rapidly becoming popular and this is the place to put our beginning teachers of geography. School superintendents are coming to see that General Science is a fad—much ado about nothing as it were—and that a course in general geography is the best possible foundation for work in the sciences. They must also soon come to realize the fact that "every Tom, Dick, and Harry" cannot teach geography.

It would seem that most of the teachers of geography whose names appear in these surveys have received their training in institutions of the Middle States. This is the section of the country which is doing most to create an interest in geography. The University of Chicago and the University of Wisconsin have proved very helpful leaders in the work, but it is doubtful if in most universities geography can get out of the shadow of geology. Few can major in geology and become successful geography teachers because such a training pays too much attention to details and classification and too little to the human side. If universities wish to train geography teachers they must establish independent departments of geography.

One teacher cannot handle all the work in geography in a normal school and have time left for electives. Neither can time in such a case be taken for research. The value of research and the preparation of a report cannot be over estimated. It serves to keep one awake and out of the ruts.

Finally let us try to choose the normals which seem to be doing the best all-around work in geography.

Far West

Cheney, Wash.
Chico, Cal.
Flagstaff, Ariz.
Los Angeles, Cal.
San Diego, Cal.

East

Farmville, Va.
Indiana, Penn.
Providence, R. I.
Salem, Mass.

Middle States

Alva, Okla.
Bowling Green, Ky.
Bowling Green, Ohio
Carbondale, Ill.
Cedar Falls, Iowa
Charleston, Ill.
Cleveland, Ohio
De Kalb, Ill.
Ellendale, N. Dak.
Emporia, Kan.
Huntsville, Tex.
Johnson City, Tenn.
Kalamazoo, Mich.
Kearney, Neb.
Kent, Ohio
La Crosse, Wis.
Macomb, Ill.
Mankato, Minn.
Maryville, Mo.
Memphis, Tenn.
Mount Pleasant, Mich.
Murfreesboro, Tenn.
Normal, Ill.
Oshkosh, Wis.
Peru, Neb.
Springfield, Mo.
Stevens Point, Wis.
Superior, Wis.
Terre Haute, Ind.
Valley City, N. Dak.
Wayne, Neb.
Whitewater, Wis.
Ypsilanti, Mich.

In closing this survey the author wishes to thank the teachers of geography who have made it possible. The encouragement given in the personal letters together with the many valuable suggestions given have been very helpful. It seems that geography with this spirit behind it must go far.

NATIONAL COUNCIL MEETING

The next annual meeting of the National Council of Geography Teachers will be held in Washington, D. C., December 28, 1921. Have you ever visited the Capital City? Now, is the time to plan the trip. Negotiations to secure special railroad rates for the Washington meeting are under way and full announcement will be made later in the *Journal*. You can aid the Secretary by writing him that you plan to attend. President Atwood is arranging an excellent program.

The Association of American Geographers plans to hold its meeting in Washington, December 29, 30, and 31.

THE RELATION OF GEOGRAPHY TO THE SOCIAL STUDIES IN THE CURRICULUM

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THE QUESTION OF DEFINITION AND ITS IMPORTANCE

What is geography? A simple question this, but one so fundamental to establishing the relations of this subject to the other studies in the curriculum that it must be disposed of before we can proceed very far with our inquiry. Let us try to answer it in the words of those who are best qualified to speak—the geographers themselves. We should distinguish at the outset between geography as it is and as it is taught—for in justice to the quotations which follow, there is in the minds of those who are speaking, a wide gulf fixed between the geographical concepts which they represent and the so-called geography that is to be found in the curriculum. It is apparently to the latter that they refer when they say "it consists of a little of everything which cannot conveniently be placed elsewhere";[1] "it is a hodge podge of all the sciences,"[2] it was easily accused of touching everything without having a definite field and an organizing principle of its own."[3]

Altho they are quite insistent that "there is no longer room for a conglomerate geography"[1] and that "geography is no longer an inventory, it is a history," "no longer an enumeration, it is a system"[4] these pronouncements are only reflected in part in the chief means possessed by the teacher or school administrator for interpreting the subject—namely the textbooks. An examination of any one of them impresses the impartial critic with the vast and comprehensive collection of data to be found within their covers, data from the fields of science, history, government, industry, commerce, sociology, psychology and economics. He may well believe that "there are no facts or phenomena which are the exclusive property of geography."[1] He may even go farther and assume that the geographer is equally at home in such widely different fields as those of pure science and ethnology.

He is quite ready to admit with the geographers themselves "the obscurity that invests the whole matter of content"[1] and the necessity

[1] Fairbanks, H. W. New Definition of Geography in *Journal of Geography*, May, 1919, p. 186.

[2] Stanley Hall, quoted by Fairbanks, New Definition, etc.

[3] Brunhes, Human Geography, 1920, p. 46.

[4] *Ibid.*, p. 29.

of splitting up its materials and placing them in their appropriate departments.[2] Says one of our leading geographers on this point in a letter to the writer: "the teachers of geography are dissatisfied with the type of geographic instruction which they have been able to provide and with most or all of the textbooks at their disposal. Even the better and more recent textbooks have failed adequately to provide the sort of material for which these lay teachers of the subject are groping."

STATUS OF GEOGRAPHY IN THE SCHOOLS

It is just because of this situation that geography is in a perilous position at the present time. Tradition will enable it to maintain its place in many of our schools for some time to come as education is notorious for being one of the strongholds of conservatism. It will only be a question of time before it yields its place either wholly or in part to other subjects which can lay a better claim to recognition in a curriculum already overcrowded.

Such a situation is hardly comprehensible when we appraise the actual progress which has been made in the field of geography under the leadership of such men as Professors Atwood, Brigham, McFarlane, McMurry, Russell Smith, Whitbeck and a host of others whom we might name. Much of this progress however, has been without any influence upon the public school. Like the scene about the tower of Babel, it has resulted in a confusion of tongues, complicating a situation which was already involved to a point where almost anything could pass muster as content or method. Within the last generation we have heard the relative merits proclaimed of first political, then physical, later commercial, later still industrial and now regional and human geography. Each has had its vogue; each its advocates. And strange as it may seem, each has helped to clarify the situation. It is however, most unfortunate that the public school has had to wait so long upon the expert to organize his own thinking and to translate his findings into terms of public education. To quote again from a teacher of geography at one of our leading universities: "Unfortunately not a few of the leading geographers of the country, both university men and men in government service, appear to be interested but little in the problems of the secondary and elementary schools."

When doctors disagree the patient is in grave danger, and the apparent disagreement, or rather the desire to satisfy every possible demand that the subject may make upon the broad field of knowledge, has not only seriously imperilled its status but has disgusted the

[2] Stanley Hall, quoted by Fairbanks, New Definition, etc.

patients for whom it would prescribe. Their dose has been a nauseating one and its after effects have been disagreeable in the extreme; and they now are considering the doctor's dismissal.

GEOGRAPHY AND THE REORGANIZATION MOVEMENT

The situation was brought home to the writer in connection with the work of the Committee on History and Education for Citizenship. Assuming that geography belonged to the social studies group and believing that the claims of instruction in citizenship called for a rapprochement between history and the other social studies that were clamoring for recognition, an effort was made to secure from those most interested in these fields a formulation of minimal requirements. Nothing but empty promises were forthcoming from the geographers, and when the Committee on Social Studies of the National Education Association, who had included geography in their tentative program of 1917, came together to ascertain how far their own aims and proposals harmonized with those put forth by the newer committee, geography did not have a single advocate. Not one constructive idea was offered in this field and there was no one in the group who showed very much concern about it. In consideration of the large number of boys and girls involved and the time devoted to the subject—time and effort consecrated by tradition—it would appear on first thought that its friends had assumed that geography's place in the curriculum was as irrevocably fixed as the proverbial laws of the Medes and Persians or as that of the three R's. This last comparison as we know is misleading from the standpoint of these subjects. Experimentation is well under way toward the reduction of the time given to these fundamental tool subjects and the results of this work are already discernible in some of the more progressive curricula.

This situation is the more strange in the light of the interest aroused in geography during the war—and the geographers had much to say about this—but here again was an apparent failure to capitalize this interest and make its influence lasting by a carefully planned attack upon the curriculum problem. The war will soon be but a memory for the bulk of our school population—changing as it does every decade—and therefore as difficult to utilize for purposes of motivation or instruction as the Spanish-American War or even the Persian Wars of blessed memory. Such courses as have been evolved have seemed on their face to be of the most transitory character and have usually involved from a half year to a year devoted to the history of the war and its geographical setting.

Demands upon Geography as a School Subject

Whatever geography may yield of value to the special investigator in the field, its contribution to the citizenship demands of the schools must be specific and concrete. Taught as it is thru the seventh and sometimes into the eighth grades, its *raison d'etre* must be established beyond question. This is especially true in the light of the junior high school movement which is fast gaining momentum; for this means moving secondary education back into the seventh grade, and offering a curriculum so rich and varied that it will not only minister to the child's natural craving for wider contacts with life but will do much toward shaping his work in the senior high school, to say nothing of its influence upon his choice of a career, or his power to adjust himself to the world about him.

With the demand for a sane kind of vocational guidance in the junior high school cycle, is it not natural to look to economic geography with its emphasis upon industries and commerce and the occupations of men for a large and important contribution? A certain amount of geography would appear to be almost a *sine qua non* for the intelligent understanding of the world of business and industry. These and other demands upon the subject make imperative the reduction of this complicated fraction of the curriculum to terms which make it more usable, and the evolution of a definition which will be intelligible to the humblest teacher.

This question of a definition in reality involves a twofold problem. Geography, if it really possesses educational value, should represent not only a body of subject matter but a method peculiar to itself and worthy of transmission to others. There should not only be left in the minds of pupils a residuum of useful, thought-provoking knowledge, but a technique, an attitude, a power, which will materially assist the student in his contact with the real problems of life.

Its Content in the Light of These Demands

Has such a content been evolved? Light has already been thrown upon this query by quotations from the geographers themselves. Does it suffice to say with one of them, that "it is a mere assembling of facts from diverse fields, facts joined together by the sole bond of a common locality" and insist that "whether we deride or apologize for this aggregation of facts, call it mere description, mere compilation, mere this or mere that (whatever it is, it is always mere) the humble task must still be performed before higher work is possible."[5] The

[5] Professor Fenneman in *Journal of Geography*, April, 1919, p. 149.

impression this leaves upon the mind is that we are still in the infancy of the subject; that we are but pioneers in an uncharted field. Certainly this offers no sure guide to our teacher friend. When we are told that "there are no facts or phenomena which are the exclusive property of geography" and that "the subject has therefore a different basis from all other branches of learning except philosophy"[6] we feel even more hopeless of a working definition which will prove intelligible to the rank and file of its exponents in the schools.

ITS ASPECTS AS A SOCIAL STUDY

The situation on the side of content is not, as we know, as hopeless as these statements would seem to indicate; but before presenting the material on the other side let us raise the question as to the interest which this problem possesses for the student or teacher of history or government. Why should he not be content to leave geography to shift for itself? The reasons are not far to seek. Let the geographers themselves speak. One is the result perhaps of this very failure to prescribe limits to the field. "If we extend the domain of geography too far," says our geographer friend, "we run the risk of leaving it altogether and running more than once into political economy and history";[7] and again, "human history is deeply rooted in the material things of the earth."[8] The historian himself realizes this close and intimate relationship; such books as those of Miss Semple,[9] Professors Brigham,[10] George,[11] and Fairgrieve,[12] bear witness to it. The emphasis in our schools upon the social bases of all development drives the teacher of history and economics back again and again into the field of geography. Some one must lay these foundations and lay them well. Is it the lone and single handed task of the teacher of history? We think not.

GEOGRAPHY AND HISTORY

History has been variously defined in the past but there is no better concept for the class room teacher to bear in mind than that expressed in the phrase *wie es eigentlich gewesen ist*, or better still *geworden ist*. The task of the historian on the side of content is then to ascertain what really mattered in the past. In securing this data he naturally

[6] Vid. Fairbanks, *supra*, p. 187.
[7] Brunhes, p. 215.
[8] Brunhes, p. 44.
[9] Semple, American History and its Geographic Conditions, 1903.
[10] Brigham, Geographic Influences in American History, 1903.
[11] George, Relations of Geography and History, 1901.
[12] Fairgrieve, Geography and World Power, 1917.

devises a technique which constitutes the method element in the subject. In actual practice this method element has been very much neglected, and the historian like the geographer has been too much concerned with securing the lodgment of worth while information. Where something more is sought—something which will make for thinking capacity, the teacher has been too prone to accept the appearance for the reality, seeing in discussion alone the outcomes desired, rather than seeking to inculcate a method, which alone commands power. Realizing how slow is the process by which these ideas have filtered down (and are still filtering down) to the schools, we should not be too hasty in our condemnation of a lack of progress in the related field of geography. Just because it is a related field we must demand an appraisal here and an adequate formulation of content and method. The work in geography is so fundamental to successful work in history and the historian's task is so gigantic even with these rather simple objectives to attain that much of this work must be left to his fellow craftsman. He should be able to assume that if left there it will often be better done. Then too, it would seem that this kind of repetition—if repetition it be—of facts in their different relationships makes for better learning and a greater economy in learning, which is no small factor in the situation.

The close relation which exists between history and geography has been so admirably stated by Professor Ramsey Muir in his address to the Historical Association of England that we quote the following brief extracts:

"Man, the industrial animal, wresting his livelihood and his luxuries, from the earth, Geography can tell us much about, tho not all; man, the conquering animal, enslaving his neighbors, Geography can tell us something about, tho not very much; man, the social being, striving in cooperation with his fellows towards a state of society which shall fulfil his perpetually enlarging conception of Justice, Geography can tell us very little about—it can only give us the setting and framework, the physical aids and obstacles to his moral strife; man, the religious being, freeing his soul from the shackles of the material that it may lose itself in the supra-material, Geography can tell us almost nothing about. And it is with man, the social being, and his strivings towards justice that we as historians are primarily concerned. We must not reject the aid the geographers can give us; but equally we must not allow them to reduce the greatness of our theme, and to rob it of its supreme value as a means for the enrichment of life. That is a danger which historical teaching runs so soon as ever it encourages its pupils to rest content with purely geographical explanations."

" . . . The conclusion of the whole matter is, that intimate as the two subjects are, they are and must remain distinct, since even when they consider the same subject matter, they consider it from different points of view. History is concerned with the evolution of organized societies, pursuing an ideal of Justice; and though the fortunes of these societies are deeply affected by geographical factors, these effects are far from being the most important considerations in the historian's eye. Geography is concerned with the earth's crust

regarded as the home of man, and all its emphasis must be laid upon these physical compulsions from which history shows him labouring to escape. Both are great subjects and invaluable as instruments of mental and moral discipline. It is permissible to hold different opinions as their relative value for these purposes. It is not permissible to throw down the boundaries between them, or to treat either merely as an appendage of the other."[13]

ILLUSTRATIONS OF CURRICULUM POSSIBILITIES OF GEOGRAPHY

Enough has been said perhaps as to the intimate relation that geography bears to history and the similarity in the problem which each presents from the standpoint of curriculum-making. To what point have the specialists in this field carried their analysis of the subject matter in terms of the public school? The most promising of these investigations are in what is called the field of human geography and this is a field which in the thought of its investigators bears a very close relation to the field of history, for, says one of them, "it is impossible to be a good human geographer[14] without a thoro historical, economic and philosophical training. On the other hand, this same authority insists that human geography is first of all geography and not psychology, sociology or history.[15] What is it in the words of its advocates? The way people live in different parts of the world and why. Physical features, climate, resources are all to be studied in the light of their influence on the life of the people, that is to say, the facts within the limits of physical geography which are related more or less directly to man and to human activity form its content. One of the clearest exponents of this phase of geography which seems to promise so much for the "lay teacher" in the grades, Professor Brunhes, reduces the whole problem to three groups of six essential facts—facts which closely relate themselves to the life and experiences of children in the early grades. They also represent much that is dramatic in the physical world in its relation to man. The first group relate to the unproductive occupation of the earth by man, leaving its traces in the house and the road; the second includes the facts as to plant and animal conquest; and the third, the facts as to their destructive exploitation at his hands. To these later groups belong the story of man's efforts to make the plant and animal worlds yield to his will, and supply his needs, in other words plant and animal conquest. Finally this destructive exploitation or *Rauberei*, as the German scholars designate it, applies to plant and animal devastation on the one hand, and mineral exploitation on the other.

[13] History, Vol. I, 1912, pp. 52, 54.
[14] Brunhes, pp. 34–35.
[15] *Ibid.*, p. 46.

The same idea, but not reduced to elements which are at the same time elementary in character—and yet they make a strong appeal to the imagination—has been presented in Huntington and Cushing's recent book, "The Principles of Human Geography."[16] This aspect of the field comes as a veritable revelation to the "lay" teacher; it makes geography take on a new aspect. In addition it commends itself to the student of curriculum reorganization. Messrs. Huntington and Cushing have analyzed the material on a different plan, recognizing that certain physical conditions have their effect upon life, this life in turn manifests itself in plants and animals, and these again relate themselves to man. Their relationships are conceived as "human responses" which are classified under the headings, material needs, occupations, efficiency, and higher needs. Among those geographical conditions which minister directly or indirectly to these last named are density of population, degree of prosperity, degree of energy, local differences in interests or resources, and degree of isolation.

Whether we accept these definitions of content as adequate and satisfactory in meeting curriculum demands they certainly are suggestive and promising in the light of the demands made upon geography as a social study. In the light of citizenship requirements it would seem that geography's place should be determined primarily in terms of its contributions as a social subject. Its purely scientific aspects will be well taken care of; they are bound to be so cared for by the advocates of general science. The human element must be the central theme in its presentation if it is to maintain an important place in the curriculum. Other phases can well be left to the upper grades.

On the basis of such an analytical appraisal as these scholars have given us, the time would seem to be ripe for developing a "course" in geography whereby the pupil is led from say the human phase, into the commercial, industrial or physical aspects of the field as the case may be. Geography classes in an elective high school curriculum will be recruited on the basis of an interest already established and a foundation already laid in earlier grades. That is what makes this preliminary work—if it may be so described—so fundamental from the point of view of the subject as a field of investigation and study in later years.

THE PROBLEM OF METHOD AND ITS IMPORTANCE

Not only have the workers in this field a content to suggest but they have also begun to devise a technique or method. This has its clearest exponent in Professor Brunhes who not only emphasizes the

[16] Published in 1921.

part played by observation, classification, etc., but proposes a form of regional study in the so-called "islands."[17] He insists that these represent more or less complete geographical units, lending themselves admirably to an understanding and appreciation of the "six facts." We discern here the regional aspect of geography which has many advocates, but applied in a way to commend itself to a master of the technique of teaching.

It would be presumptuous in a student of history to propose any course, even along the lines suggested by these writers, but the prospects of an effective cooperation or coordination of the social studies seem brighter when we consider the direction in which these studies and definitions are tending. A geographer like Mr. Fairgrieve also makes a very real contribution when he lays down the principle of geographic control,[18] suggesting the possibilities of a course for the seventh and eighth grades paralleling that proposed by the Committee on History and Education for Citizenship which provides for a world survey at this point.

THE PRESENT CRISIS AND ITS NEEDS

What is the next step to be taken by those interested in this problem? For the teacher of geography on the firing line it is to acquaint herself with these newer definitions and to have the courage to revise and eliminate and reorganize from year to year on the basis of her classroom experiences and reactions. The chief burden however, rests upon the geographers themselves. They must reduce to simple terms the educational possibilities which they see inherent in the subject so that they may be readily grasped. A definition must be phrased in terms of its special, peculiar contribution to the education of our young people. The geographer, like the historian, must wield a rifle and not a shotgun. He must know what he is aiming at and must not trust to a stray shot or shots to reach the mark. He must stake his claims in terms of minimal requirements which impress the educator by their very reasonableness and their recognition of the claims of other closely related subjects, being careful not to ask for an excessive allotment of time. He must cease expecting the subject to shift for itself or wait upon his good time for the attention which it deserves. If he does not assert its claims, and that in no uncertain language, the leadership of the reorganization movement so far as it concerns geography will pass into other hands and possibly to the prejudice of subject matter and its place in the curriculum.

[17] Human Geography, p. 52, chaps. VI–VII.

[18] Fairgrieve, Geography and World Power.

The work performed by the National Council of Geography Teachers and their stimulating organ, the *Journal of Geography*, should not be discounted but a journal will not suffice. Action on the part of the geographers in the form of tentative syllabi is imperative and this action must not be long postponed. Let alternative schemes be suggested as a further basis for experimentation, but the day of wishy-washy compromise schemes has passed. Uncertainty on the part of the specialist breeds uncertainty on the part of others, and certainty can come only from more careful experimentation.

THE GREAT VALLEY—A FUNCTION OF LIMESTONE

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MOUNTAINS, VALLEYS AND BEAUTIFUL LANDSCAPES

If you should climb to the top of the forested Blue Ridge Mountains, you would be standing at the northwestern edge of the Piedmont. Look westward, and you will see a fertile land lying several hundred feet below. If it is spring or early summer you will see fields of the rich brown color of fresh, plowed earth, and fields showing the varying colors of wheat, corn, clover, pasture, and dark green patches of woodland. You will discover bits of road, farmhouses, big farms and sometimes a bit of river shining in the sunlight. On a clear day you can see the dark blue of another ridge twenty or thirty miles west of where you are. This lowland which lies between these two ridges is the Great Appalachian Valley, and the distant ridge is its northwestern edge. Beyond that is a little narrow valley, then another ridge, and another, and another, and another, until finally, after thirty or forty miles of narrow ridges and the valleys between them you come to a ridge that has but one side. Reaching its top you do not see another valley but instead the level land of the Appalachian Plateau stretching away towards the west. The Appalachians comprise these two parts, the ridges and valleys on the east, and the plateau on the west stretching from New York to Alabama.

It is the purpose of this article to discuss some of the aspects of the Appalachian valleys.

A GREAT VALLEY HIGHWAY

In this region is one of the longest mountain valleys to be found anywhere in the world. It is called the Great Appalachian Valley.

The Great Valley is so much more level than the Piedmont that it is a king of natural highways. From the Cotton Belt in Alabama to the Hudson Valley in New York it furnishes a continuous open road thru the eastern highlands. One may travel over its entire length from the Hudson Valley to the Cotton Belt without crossing a single mountain ridge, but all the way one will see mountains to the east or west running parallel to the Great Valley, but never crossing it. Two branches of the Ohio River drain parts of this valley and five Atlantic rivers drain a part of it and then break thru its eastern wall.

The Great Valley has long been a route of travel. Even in the days before the Revolutionary War its open road tempted the English Quakers and the German colonists of Eastern Pennsylvania to travel south in search of new lands to settle. Some of them settled in the Maryland part of the Great Valley, others went on thru the West Virginia part and into Virginia, and as far south as the headwaters of the James.

Later this route helped other settlers on their way to the valley of the Ohio. Some left the Great Valley near Shippensburg in southern Pennsylvania and went over the mountains to Pittsburgh. There flatboats drifting down the Ohio river took settlers to points in Ohio, Indiana, and Kentucky. Other settlers from Maryland, Virginia and North Carolina, bound for Kentucky, drove on down the Great Valley to the headwaters of the Tennessee. Here there is a notch, or gap, in the Cumberland Mountains which form the western wall of the valley. Cumberland Gap is close to the place where Virginia, Tennessee, and Kentucky join. It makes an open road in the mountain wall thru which the wagons of the early emigrants toiled into the forested country of Kentucky. For many years after the Revolutionary War one family every hour, on the average, drove thru this gap seeking a new home to the westward. During the Civil War the valley was the roadway by which the Southern armies went north and the Northern armies went south. The battles of Antietam and Gettysburg illustrate this fact.

LIMESTONE AND ROADS

The Great Appalachian Valley became the great highway for two reasons. First, it is nearly level, and therefore it is much easier to travel there than on the Piedmont, where there are hills, or in the Coast Plain, where there are many deep rivers to cross. The second reason is that limestone is plentiful there. No other stone makes good roads so easily. Because it has limestone the Great Valley has many

more miles of good stone roads than has the Piedmont region across the ridge to the eastward. On the main valley pike one may, in pleasant seasons of the year, meet automobilists from many states. They come to tour over the wonderful roads of this beautiful section.

LIMESTONE AND VALLEY MAKING

This entire region was once a high plateau. Because limestone dissolves in water more easily than any other stone, the limestone region has been more quickly worn down and therefore has a lower surface than that of the hard sandstone. In this way the limestone strips became valley and the sandstone strips remained ridges.

LIMESTONE AND AGRICULTURE

The limestone rock of which the valley floor is made breaks up into a very fertile clay soil, which is good for wheat, corn, and hay. Therefore most of the people of this region make their living by farming. The rich valley fields are covered with grain or dotted with grazing animals. Each year fat cattle and great quantities of wheat are shipped to the cities of the north and east.

LIMESTONE AND IRON

Limestone has done more to make this valley useful to man than just to give fertile soil and good roads. It has helped to make deposits of iron ore. It happens that little streams of water sometimes carry tiny quantities of iron in solution, just as a cup of coffee may hold sugar in solution. If water carrying particles of iron flows over limestone, the water gets a little of the limestone in solution. Strange to say, this makes the water drop the iron. Wherever this occurs beds of iron ore are formed beside the limestone. Sometime after years and years have passed these iron ore beds may become many feet thick. Since there is limestone from end to end of the Great Valley, there are also iron ore deposits thruout its length. Iron furnaces are at Bethlehem and Lebanon in Pennsylvania, Roanoke in Virginia, Birmingham in Alabama, and at other places.

LIMESTONE AND CEMENT

Limestone is a raw material used for another industry—cement making. Cement is limestone and slate or limestone shale and rock cracked into chunks, burned in a furnace and then ground to powder. In many places in the valley or along its sides, slate quarries and limestone quarries can be found near together. Because of this proximity there are cement plants at several points along the valley. The great-

est cement center is in the Lehigh Valley, near Allentown and Bethlehem. In that locality the industry is especially flourishing because the great port cities of Philadelphia and New York are only about a hundred miles away. Those cities use much cement and also they ship quantities of it over sea.

RIVERS

Before there were railroads rivers were most useful to farmers. They were the highways along which wheat went down to tide water in flat boats. This was such hard work that it is no longer done. The only navigable river of the Great Valley is the Tennessee, up which boats travel as far as Knoxville.

The different parts of the Great Valley have been named after the rivers that drain them. Near the Delaware, it is called the Lehigh Valley, because that part is drained by the Lehigh River, a branch of the Delaware. In southern Pennsylvania it is called the Cumberland Valley and in northern Virginia the Shenandoah Valley, because a long river of that name drains a part of the valley into the Potomac River.

TOWNS AND TOWN LOCATION

Towns grow at places where there is advantage resulting from deposits of minerals, agricultural richness, good and healthful climate, and other natural resources, combined with facility for communication with the outside world. Towns become cities when they are favored with a large degree of one or more of these advantages.

The Great Valley has no large cities like New York, Philadelphia or Baltimore, but it has many smaller ones. A town or small city is to be found at almost every place where railroads cross the valley and enter the plateaus to the westward or the Piedmont to the eastward. Where roads cross is a good place for people to meet to buy and sell goods. At such places stores and blacksmith shops are built and villages grow. Where a road from the Blue Ridge or the plateau crosses the main highway in the Great Valley, we find a small town. Where one or two big railroads cross the Valley, we find a larger town. The cities of Allentown and Bethlehem are at the place where the advantage of natural resources is combined with that of communication. The Lehigh Valley lets railroads pass out of the Great Valley into the coal fields, so that these cities are throbbing with manufacture and busy with cement, iron, and steel mills.

The thriving city of Reading is at the place where the Schuylkill river gives an easy route to Philadelphia. The city of Harrisburg arose

where the Susquehanna Valley makes a break in the highlands and the main lines of the Pennsylvania railroad from Baltimore to Buffalo cross the line from Philadelphia to Pittsburgh.

The Potomac valley has two railroads into the highlands; on the north side the western Maryland railroad, which has helped to make the city of Hagerstown; and on the south side the Baltimore and Ohio, which has helped to make the city of Martinsburg. In central Virginia the main line of the Chesapeake and Ohio railroad goes from Richmond thru the West Virginia mountains to Cincinnati. At the point where it crosses the railroad going down the Great Valley is the city of Staunton. In the same way the Norfolk and Western line between Norfolk and Cincinnati has made the city of Roanoke.

Knoxville is in the center of the rich farming region of the Tennessee section of the Great Valley. Chattanooga has arisen where the Tennessee River lets steamboats carry valley produce thru the plateau toward the Ohio.

The largest of all the Valley cities is Birmingham, Ala., which, altho it is in the Cotton Belt, is also at the lower end of the Great Valley. Here we find a rare thing happening. One place has the three things needed to make iron—coal, iron ore, and limestone. Nearly everywhere else in the world one at least of these things has to be carried long distances to the place where one or both of the others are found. At Birmingham you can stand at one place and see the mouth of the coal mine, the quarry for the limestone, and the open pits on the hillside from which the iron ore is being dug. At no other place in the world can iron be made so easily. So Birmingham, busy with its iron furnaces, is growing rapidly.

At Chattanooga there are iron and steel plants, machine shops, wood working plants, and cotton mills. Factories making some or all of these things can be found in any large town in the Great Valley. The nearby Appalachian Plateaus furnish both wood and coal to the Valley towns.

FUTURE

The towns of the Great Valley will continue to be prosperous. The fertile valley farms give a nearby food supply; the local mines and quarries have plenty of material for cement plants and iron mills; the mountains can furnish wood; the plateau to the westward can furnish coal; and the railroad that comes thru from the south can bring cotton for the cotton and knitting mills that are already established in many towns.

GEOGRAPHICAL PUBLICATIONS

Mendel E. Branom and Fred K. Branom. **The Teaching of Geography.** 292 pp. Ginn & Co., New York. 1921. $1.48.

This little book, written as the authors state out of their experiences as teachers of method courses in normal schools and universities, is primarily for students interested in geography teaching in the elementary schools. Thruout the authors reveal a thoro acquaintance with elementary school conditions as they exist in the better schools of the country. The authors have not only drawn upon their own experiences as geography teachers and as observers of geography teaching but they have covered in a very thoro manner most if not all the literature dealing with present day geography teaching. A bibliography of such literature classified as to topics is appended to each chapter.

The viewpoint of the authors is that of the educator who is interested primarily in using geographic material in "giving the child desirable experiences." The book neither proposes nor supports pet or cranky theories in geography methods. It simply presents discussion of past and present geography methods. It also presents in an interesting way the present day movements and practices in geography teaching.

Particularly striking and suggestive are the chapters on "The Relation of Geography to Other Subjects," "The Practical Nature of Geography," "The Organization of a Course of Study," "Class Organization" and "Socialization and Free Activity," and especially those dealing with motivation in geography, the problem method, the argumentative lesson, journey geography, type studies, dramatization and the project. The last chapter is a discussion of "Tests and Scales."

The "Suggestions for Further Study" found at the close of each chapter will prove helpful to the teacher using the book as a text by stimulating healthy class discussions. The book should also prove valuable for teachers' reading circles.

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Charles A. McMurry. **Teaching by Projects.** 257 pp., 1 diagr. The Macmillan Company, New York, 1919.

The author uses the word project in a very broad and comprehensive sense. He distinguishes the following types of projects: first, simple objective projects of the handwork type, such as gardening; second, commercial and industrial projects, in which geography abounds, such as installing irrigation systems; third, projects in applied science, such as the steam engine; fourth, projects in biography and history, such as Columbus' first voyage; and fifth, masterpieces of literature considered as projects. According to this classification, the project method is applicable to every subject. Unfortunately the author does not help in clearing the confusion that exists regarding the meaning of the word project; on the contrary he adds to it. In various places thruout the book he calls the project a problem, a topic, a large unit of study, a teaching unit, and a type study. If project is synonomous with all these, it loses its educational significance. If project and topic are the same thing, then the project idea can contribute little to educational thought and procedure. While there is no general agreement on what a project is, the reviewer believes that the majority of writers on educational subjects agree that a topic is not the same as a project. The bulk of the book is given up to the discussion of the place in education of large teaching units, which the author calls projects. The book is full of constructive, progressive, and helpful suggestions embodying the more modern ideas in education. Teachers will find themselves amply repaid by a careful reading of its pages.

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Mankato, Minn.

C. H. Gordon. **Field Studies in Geography and Geology.** 28 pp. Cooperative Bookstore, University of Tennessee, Knoxville, 1920. 75c.

The book contains outlines and directions for six local field trips conducted by the Department of Geology of the University of Tennessee. "They are designed to serve as a guide to the student in the observation and interpretation of physiographic and geologic phenomena to be found" about Knoxville. A table of contents and page numbers would materially improve the book.

John J. MacFarlane. **Import Trade of the United States in 1920.** 2 diagr. *Com. Am.*, Apr., 1921, p. 33.

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————, **The World's Meat Supplies.** *Com. Am.*, May, 1921, p. 41.

Florence Craig Albrecht. **Bermuda.** 5 photos. *Bull. Geog. Soc. of Philadelphia*, Oct., 1920, p. 81.

G M. Dyott. **From the Pacific to the Amazon and Back.** 5 photos. The *South American*, Apr., 1921, p. 7.

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H. N. Whitford. **Tropical American Woods for Markets of United States.** 13 photos. *Bull. Pan. Am. Union*, June, 1921, p. 567.

L. C. Dunsterville. **From Bagdad to the Caspian in 1918.** 1 map, 8 photos. The *Geog. Jour.*, Mar., 1921, p. 153.

E. H. L. Schwarz. **The Control of Climate by Lakes.** 2 maps. The *Geog. Jour.*, Mar., 1921, p. 166.

Roderick Peattie. **The Resources of the Lower St. Lawrence Valley.** 1 map, 3 photos. *Scot. Geog. Mag.*, Apr., 1921, p. 103.

Sir Halford Mackinder. **Geography as a Pivotal Subject in Education.** The *Geog. Jour.*, May, 1921, p. 376.

————, **The City of Glasgow: Its Origin, Growth, and Development.** 80 pp., 9 maps, 5 plates, 1 diagr. *Scot. Geog. Mag.*, Jan., 1921.

Alfred H. Brooks and Morris F. La Croix. **The Iron and Associated Industries of Lorraine, the Sarre District, Luxemburg, and Belgium.** 131 pp., 12 grafs and diagrams, sketch map of district, pocket map of Lorraine region in colors, approx. 25 x 33 inches. Bulletin 703. United States Geological Survey, Washington. 1920.

Nelson C. Brown. **Lumber Markets of Spain and Portugal.** 151 pp., 27 photos. Special Agents Series No. 201. Bureau of Foreign and Domestic Commerce, Washington. 1921. 35 cents.

W. L. Schurz. **Paraguay, A Commercial Handbook.** 195 pp., 20 photos, one economic map in colors, approx., 22 x 30 inches. Special Agents Series No. 199. Bureau of Foreign and Domestic Commerce, Washington. 1920. 40 cents.

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